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# THE ELEMENTARY SCHOOL TEACHER

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## NATURE-STUDY AND SCIENCE WORK IN THE FRANCIS W. PARKER SCHOOL.

### I. NOTES.

THE following outline represents the work in nature-study and science as it is planned for the ensuing year, for the first eight grades, in the Francis W. Parker School.

The studies here included fall into two groups: those in which the children are brought into direct contact with the phenomena of nature, and those in which they work with materials in their natural state. The studies of the first group help the children to enjoy the beauty of nature and to appreciate the laws which underlie its various manifestations; those of the second lead them to discover, through their own experiences, the principles and processes of the great primary industries—those pertaining to food, shelter, and clothing.

The purpose of the outline is to set forth, for study and criticism, the quantity and quality of the above-mentioned work. On account of lack of space, the outline is most incomplete. It is not possible within its limits to give the related work in history, mathematics, literature, and art, or a description of all the forms of study and expression which the work involves in each grade. All of the handwork of the school might properly be placed in this outline, but much of the work in wood and metal does not appear because it is not correlated with the science or nature-study work.

If the outline is read from the top downward—that is, if the work of one grade only is considered—it must be remem-

bered that only part of the work of the grade is represented, so that there is sometimes little apparent unity or connection between the subject-matter which appears there and the occupations. If, however, the outline is read from left to right, according to the subjects as they appear in each grade, it is easy to observe the progression in each phase of the work, and to trace the attempt which has been made to follow the growth of the children from grade to grade, in their enlarging experiences, their increased physical ability, and their greater intellectual development.

It should be understood that almost all the work outlined is done in response to some demand of the school community—a demand which the children are able to understand and appreciate, so that in every phase of the work—in the experimental science, in cooking, in gardening, and in the occupations—the goal of the child's efforts seems to him "worth while," and he is stimulated to his highest degree of activity and sustained through the necessary drudgery by the interest which he has in the end to be attained.

In order to give this part of the work its full significance, it will be necessary to state briefly the general plan and purpose of the school: The school was organized to carry out, as far as possible, the educational theory of Colonel Francis W. Parker, which demands that all the work of the school should tend directly to the formation of perfectly developed human beings—toward the creation of an ideal community. This ideal governs the selection of work throughout the course, and in order that the movement shall be continuous from the kindergarten through the high school, it is obviously necessary to select the work, primarily, with reference to the ideal, but also with reference to the individual experiences, social requirements, and interests, and, again, with reference to the physical and mental stage of development of the children in each grade. The controlling educational principle in the selection of the work is that self-activity is the law of growth. Under this ideal the child's will and his motives in work become the essential consideration of the teacher, rather than the acquisition of certain definite knowledge; the knowledge

	FIRST GRADE	SECOND GRADE	THIRD GRADE
NATURE-STUDY AND SEASONAL OBSERVATIONS.	Observational study of landscape: recording of seasonal changes in a series of paintings; study of temperature, noting its most obvious effect upon trees, flowers, seeds, insects, birds, animals, man.	Observation of landscape continued: recording growth of particular plants and trees in a series of paintings; special attention to plants and animals in Lincoln Park.	Elementary study of climatic conditions in Chicago: keep class daily weather record; finding average temperature, rainfall, etc.; special study of water and moisture conditions in the vicinity.
GEOGRAPHY.	Frequent excursions to typical areas in vicinity of school: trips to farm; interrelation between farm and city activities.	Excursions to industries and market gardens: South Water Street; groceries; lumber yards; etc.	Excursions to typical city streets and landmarks: study of Lake Michigan and Chicago harbor; water action on shore and in ravines.
EXPERIMENTAL SCIENCE.	Simple laboratory experiments in connection with the work in history, geography, cooking, gardening, and with all the forms of hand-work in the grade.	Laboratory experiments in connection with the various occupations of the grade, special experiments with food, wood, and textile materials.	Experimental study of the modern and primitive methods of city illumination, transportation, and water-supply; of the heating and lighting of plants of the school and of homes.
COOKING.	Preservation of garden produce: drying of fruit; popping of corn; canning of pumpkins; baking of apples; making of potato starch; cooking of simple starch foods; making of barley-sugar candy and rock candy for Christmas.	Preparation and serving of simple foods for luncheon: canning of fruit; making of grape juice and jellies; milling and cooking of cereals; making of cocoa; making of pop-corn balls and of hard and cream candies.	Regular preparation of food for midday luncheon: canning of fruit; preservation of food products; making of table soup, bread, butter, cheese; testing of food for starch and gluten; making of harder candies.
GARDENING.	In the Spring Quarter planting of such vegetables as lettuce, onions, or radishes which will mature before school closes; and of pop-corn, beans, and pumpkins to be harvested in the Fall Quarter.	In the Spring Quarter gardening will take the place of cooking: planting of early spring vegetables and of celery, melons, corn, and wheat. Harvesting in Fall Quarter.	In the Spring Quarter gardening instead of cooking: planting of tomatoes and selected vegetables; of grain and of blooming flowers; special study of soil and water conditions of the garden. Harvesting garden crop in the fall.
INDUSTRIAL HISTORY: Study of materials and of modern processes and primitive methods of doing necessary work.	<i>Subject.</i> —Study of homes and home activities. <i>Hand-work.</i> —Construction of play-houses. Incidental study of materials involved: those used in house, furniture, dishes, bricks, rugs, etc. Outdoor construction of crude shelters adapted to the season: wigwams, igloos. Primitive life in such homes, compared with the child's own life.	<i>General subject.</i> —The fundamental world industries, those involving the food, shelter, and clothing of people. <i>Special phases of work emphasized in second grade:</i> market gardening; lumbering; cloth-making. <i>Hand-work.</i> —Weaving of a crude cloth; making of garden; invention of ways to do work; comparison of own work with that done by modern and by primitive methods.	<i>Subject.</i> —The development and growth of typical city industries: industries selected for special study in this grade: system of illumination, transportation, and water supply. <i>Hand-work.</i> —Making of a model of cars for the kindergarten; planning and constructing of cars; casting of wheels; track rails; study of modern

DE	THIRD GRADE	FOURTH GRADE	FIFTH GRADE	SIXTH GRADE
landscape con- growth of and trees in a ; special at- and animals	Elementary study of climatic con- ditions in Chicago: keeping of class daily weather record; finding average temperature, rainfall, etc.; special study of water and moisture conditions in the vicinity.	Study of climate of Chicago con- tinued: keeping of weather records; special attention to air and wind conditions; study of type forms of landscape in the United States; use of stereop- ticon pictures.	More analytical study of land- scape: relation of plants and animals to soil and climatic conditions; keeping of individ- ual weather records; compari- son of seasonal changes in different parts of North Amer- ica.	Study of land- scape of North America: reading of maps; special study of length of day
ies and mar- mouth Water ; lumber	Excursions to typical city indus- tries and landmarks: study of Lake Michigan and Chicago harbor; water action on lake- shore and in ravines.	Study of mountains, seacoasts, valleys, rivers, flood-plains: topography of Greece; work largely co-related with history.	Shape of earth: study of com- pass; excursions to areas to study erosion by wind and water; laboratory experiments showing the formation of coast- al plains and sunken rivers, etc.	Physiographic distribution of animals upon land areas, swam- p regions, etc.;
nts in con- various occu- de, special food, wood, is.	Experimental study of the mod- ern and primitive methods of city illumination, transporta- tion, and water-supply; study of the heating and lighting plants of the school and of homes.	Elementary mineralogy: experi- mental study of the formation and erosion of limestone. Elementary physiology: study of air, water, and foods.	Laboratory experiments in connec- tion with the study of textiles and pottery. Special study of coal and gas.	Elementary p- hysics and conder- Experimental tion. Examination plants and
ing of simple ; canning of grape juice g and cook- making of of pop-corn and cream	Regular preparation of foods for midday luncheon: canning of fruit; preservation of garden products; making of vege- table soup, bread, butter, and cheese; testing of foods for starch and gluten; making of harder candies.	Regular preparation of foods for midday luncheon: canning and pickling of tomatoes; making of meat and vegetable soups; of custards, and of gelatine dishes; study of albumen as food principle: making of caramels for Christmas candy.	New England and southern colo- nial styles of cooking used in preparing for special luncheons and parties: making of jellies for Thanksgiving; making of cornmeal cakes; of brown bread; baked beans and baked Indian pudding, pumpkin pie, and doughnuts.	Preparation of candies: special study of sug- ar making of cream, etc. sugar crystals
er gardening of cooking: spring vege- lery, melons, Harvesting	In the Spring Quarter gardening instead of cooking: planting of tomatoes and selected vege- tables; of grain and of fall- blooming flowers; special study of soil and water conditions of the garden. Harvesting of garden crop in the fall.	Gardening in Spring Quarter: planting of Indian corn; beans, flax, hemp, and cotton to be harvested for the fifth-grade work in the following Fall Quarter in the study of colonial industries.	Gardening instead of cooking in the Spring Quarter: planting of a selected grain or vege- table for school use; planting of sugar beets, sorghum, and sugar cane for harvesting the following fall by the sixth grade.	Gardening in the Spring Quar- ter: planting with refer- ence to the seed germi- nation and growth.
fundamental those involv- ing, and cloth-	<i>Subject.</i> —The development and growth of typical city indus- tries: industries selected for special study in this grade; city system of illumination, trans- portation, and water supply. <i>Hand-work.</i> —Making of a train of cars for the kindergarten: planning and construction of cars; casting of wheels and track rails; study of motors.	<i>Subject.</i> —Study of requirements of city continued: Athens as model city; Greek life and work. <i>Correlated hand-work.</i> —Making of pottery: making of models of Greek building and of statu- ary: study of the materials used in modeling.	<i>Subject.</i> —Colonial history: In- dustries of the colonies: type industry selected for study in this grade—textiles. <i>Hand-work.</i> —Entire process of preparation of wool and cotton for use: dyeing and weaving; making of vegetable dyes; basket- and bead-weaving.	<i>Subject.</i> —In- dustries of the Un- ited States: study of stu- dious school <i>Hand-work.</i> — in iron: mak- ing of bri- quettes for the garden.

FIFTH GRADE	SIXTH GRADE	SEVENTH GRADE	EIGHTH GRADE
<p>analytical study of land- : relation of plants and als to soil and climatic tions; keeping of individ- weather records; compari- of seasonal changes in ent parts of North Amer-</p>	<p>Study of ladsapes and climates of North and South America; reading of government weather maps; special attention to length of day and night.</p>	<p>Climatic conditions of Eurasia compared with those in Amer- ica: making of coutour maps; study of typical landscapes in different parts of the world.</p>	<p>Summary of previous work in nature-study: carbon cycle— law of conservation of matter and energy as illustrated by the cycle of carbon from the inorganic state through vege- table and animal life, back into the inorganic state.</p>
<p>of earth: study of com- excursions to areas to erosion by wind and ; laboratory experiments ing the formation of coast- lains and sunken rivers,</p>	<p>Physiographical types in vicinity: distribution of plants and ani- mals upon selected areas; shore areas, swamps, glaciated re- gions, etc.; elementary forestry.</p>	<p>Physiography continued: map- ping of areas; field work; spe- cial study of Eurasia.</p>	<p>Study of world as whole: con- tinental structure, with labora- tory work to illustrate or ex- plain class problems.</p>
<p>ory experiments in connec- with the study of textiles pottery. study of coal and gas.</p>	<p>Elementary physics: evaporation and condensation. Experimental study of fermenta- tion. Examination of structure of plants and animals.</p>	<p>Experiments in plant physiology and field botany: microscopic examination of the cellular stucture of plants. Experiments in mineralogy in con- nection with the classification of minerals for the school museum. Elementary geology.</p>	<p>Summary and classification of the physics and chemistry experi- ments of previous grades. Ex- periments in physics, chemis- try, and physiology as demanded in the study of conservation of energy.</p>
<p>ngland and southern colo- nstyles of cooking used in irring for special luncheons parties: making of jellies Thanksgiving; making of meal cakes; of brown ; baked beans and baked n pudding, pumpkin pie, doughnuts.</p>	<p>Preparation of special class lunch- eons: special work in extrac- tion of sugar from sugar beets; study of artificial freezing; making of frozen dishes, ice cream, etc.; special study of sugar crystallization, etc.</p>	<p>Preparation of at least three luncheons during the year as a review of previous work and requiring a simple classification of the foods in making of menus. Special emphasis given to the study of temperature: oven temperatures; effect of heat upon food principles.</p>	<p>Used only as laboratory work in connection with other science work: study of food as form of energy and as fuel; of the food principles and the value of each; noting of the processes and effects of cooking.</p>
<p>ing instead of cooking in Spring Quarter: planting selected grain or vege- for school use; planting sugar beets, sorghum, and cane for harvesting the wing fall by the sixth e.</p>	<p>Gardening in the Spring Quar- ter: planting of selected seeds with reference to fall work in the study of plant structure, seed germination, and plant growth.</p>	<p>Laying out of garden for entire school: use of garden as lab- oratory in the study of plant physiology; study of effect of heat upon soils.</p>	<p>Planting and harvesting of se- lected vegetables or grains for the use of the school: garden used to illustrate work in science—one example of car- bon cycle.</p>
<p>.—Colonial history: In- tries of the colonies: type story selected for study in grade—textiles. <i>work.</i>—Entire process of paration of wool and cotton ase: dyeing and weaving; ng of vegetable dyes; et- and head-weaving.</p>	<p><i>Subject.</i>—Industrial development of the United States: special study of steam engine and vari- ous school machinery. <i>Hand-work.</i>—experimental work in iron: bridge-making: mak- ing of bridge for the kinder- garten.</p>	<p><i>Subject.</i>—Arts and crafts move- ment of the Middle Ages; work of guilds. <i>Hand-work.</i>—Bookbinding and printing: entire process of making a book; preparation and tanning of leather for a book cover: binding of maga- zines of the school for the library.</p>	<p><i>Subject.</i>—American institutions and government; English his- tory. <i>Hand-work.</i>—To show outcome of eight years' work: work in wood, metal, textiles, and clay: problems in construction and decorative design.</p>

acquired is, however, of the utmost importance in the teachers' eyes, because it is an absolute measure of the quality of the work done.

Finally, the outline as here presented is in no sense a finished product. It is the outcome of the thought and experience of the teachers of the school. It represents their efforts to find the best experimental work for each group of children, keeping in mind their entire school life.

In the study preceding the making of the outline the value of work was judged by certain standards. These standards of value may be made evident by the following statements concerning the efforts which were made: (1) to select only that work which is intrinsically valuable, capable of arousing strong images—possessing possibilities of infinite growth—work in harmony with the ideal of the school; (2) to choose the work best adapted to the children, judging from their experiences, their fundamental interests, and their various stages of development; (3) to discover the real demands of the school community, and so distribute or grade them that in each group of children the work should be new enough, difficult enough, and attractive enough to stimulate them to genuine independent hard work; (4) to make the school environment rich and varied enough in material and problems to furnish incentives to work in many directions—thus providing for the all-around development of the children; (5) to cultivate in the children throughout their school life a respect for good work and good workers, and to leave them with a genuine desire to discover the laws and truth of things, and with a wholesome, open-minded attitude toward nature, humanity, and God.

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